"The future cannot affect us, but we can be affected by conceptions of the future."

Ch 21 (and more)
Regional Context

Lies at the heart of decision making, at the intersection of WG1 / 2, and between WGII part A and Part B

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A fundamental problem: WGII is intended to support decision making, which takes place at local to regional scales.

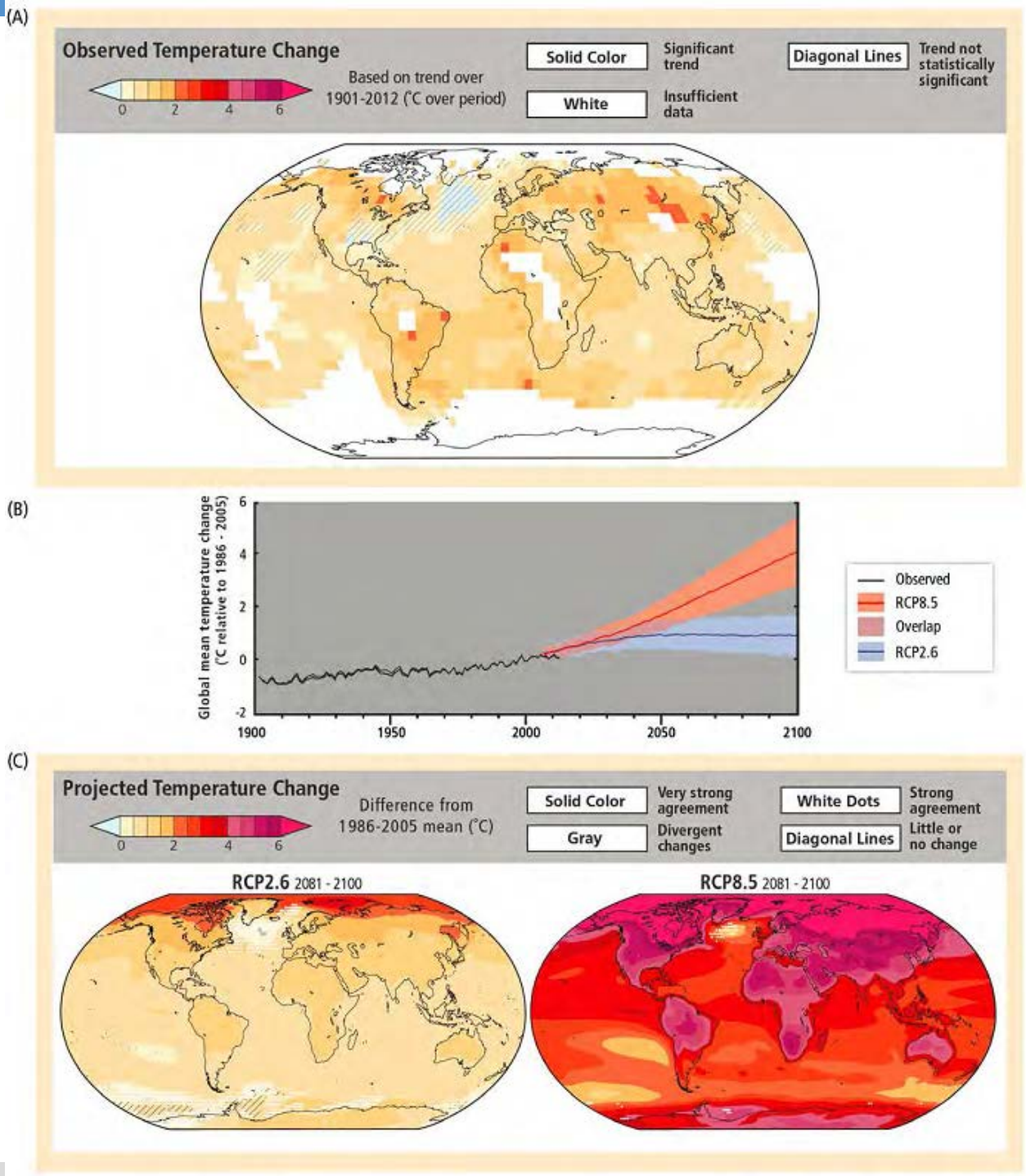


Fig SPM 4.

Q: What is the context you need to be aware of, if you carry responsibility for decisions?

Chapter speaks to (among others):

- global and regional issues in a decision-making context.
- different scales of decisions that are made
- trans-regional and cross-regional issues that affect both human and natural systems
- methods of assessing regional vulnerabilities and adaptation, impact analyses, and the development and application of baselines and scenarios of the future.

Grounding this in real world (hypothetical) example: You are a city manager bidding for $100 million aid funding – you can only do one of the following

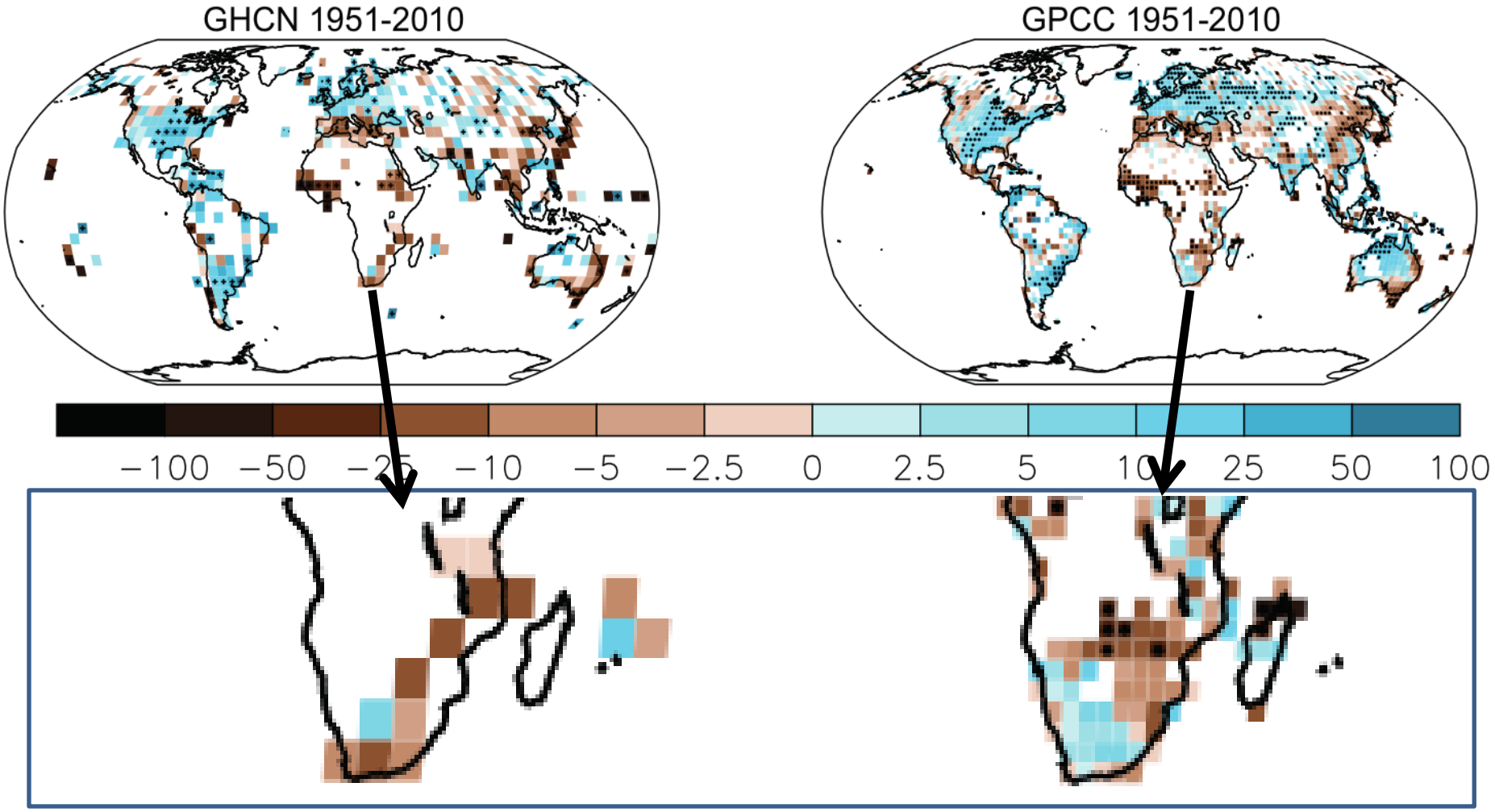
Option A: Maintenance of cities current water infrastructure – especially the storm water system.

Option B: Improve the supply of water to the city to support growth.

Your choice has implications of ethics and values, political consequences, real societal impact, affects the constraints on development, and includes regional and trans-boundary dependencies.

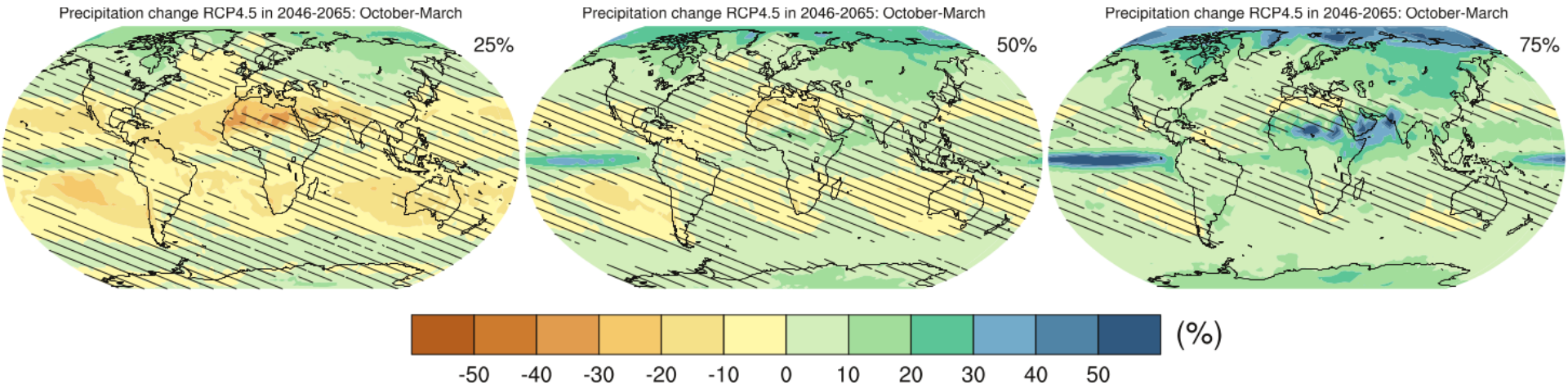
Option A: Maintenance of cities current water infrastructure – especially storm water system.
Option B: Improve the supply of water to the city – support growth

AR5 WG1 | The Historical Perspective



Option A: Maintenance of cities current water infrastructure – especially storm water system.
Option B: Improve the supply of water to the city – support growth

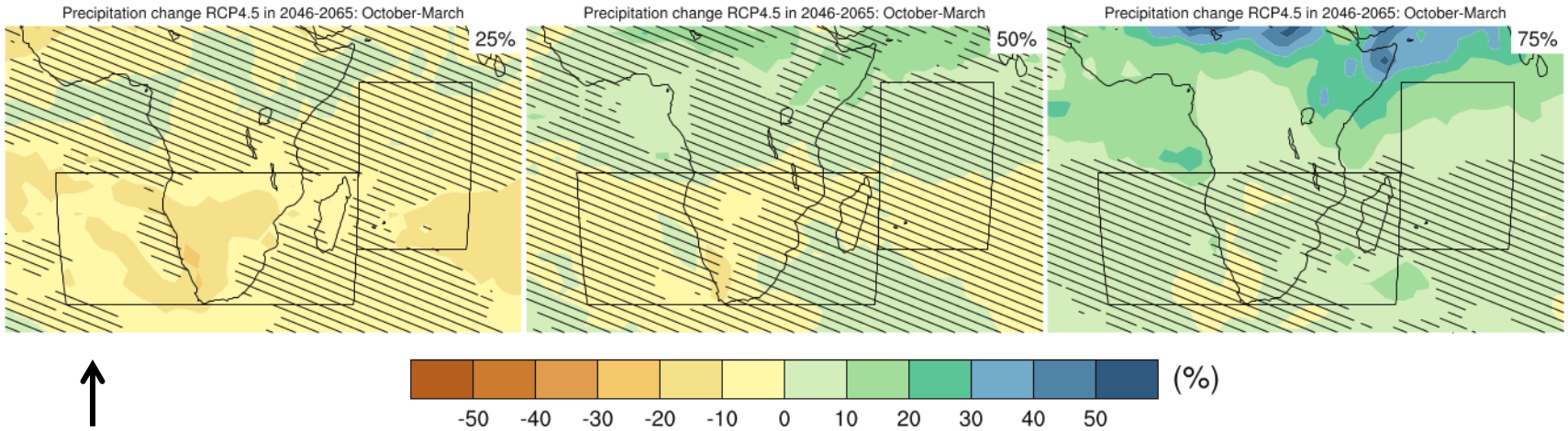
AR5 WG1 | Global precipitation change



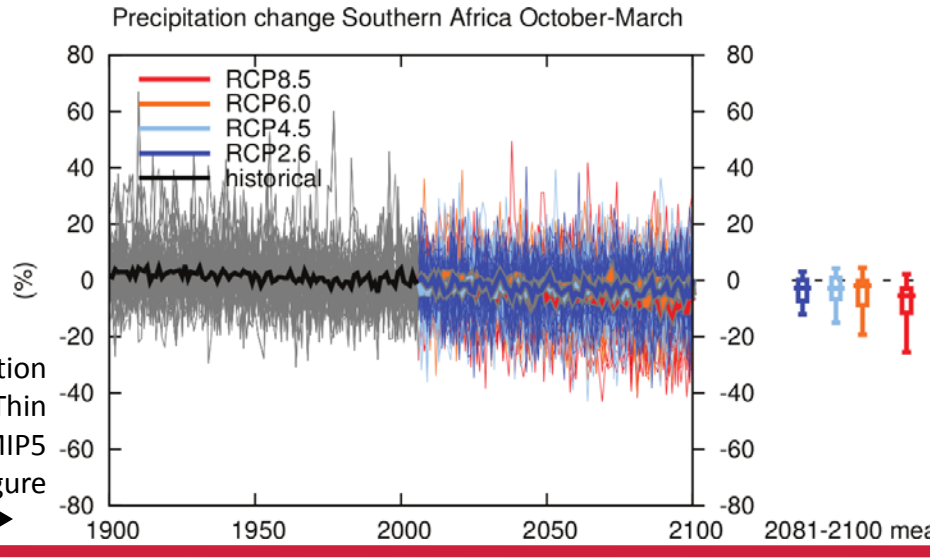
Maps of precipitation changes in 2046–2065 with respect to 1986
–2005 in the RCP4.5 scenario. The 25th, 50th and 75th percentiles of the distribution of the CMIP5 ensemble are shown; this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-year mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-year mean differences. Adapted from IPCC AR5 Synthesis Report 2014 (Figure AI.6)

Option A: Maintenance of cities current water infrastructure – especially storm water system.
Option B: Improve the supply of water to the city – support growth

AR5 WG1: Annex 1 | Regional Atlas



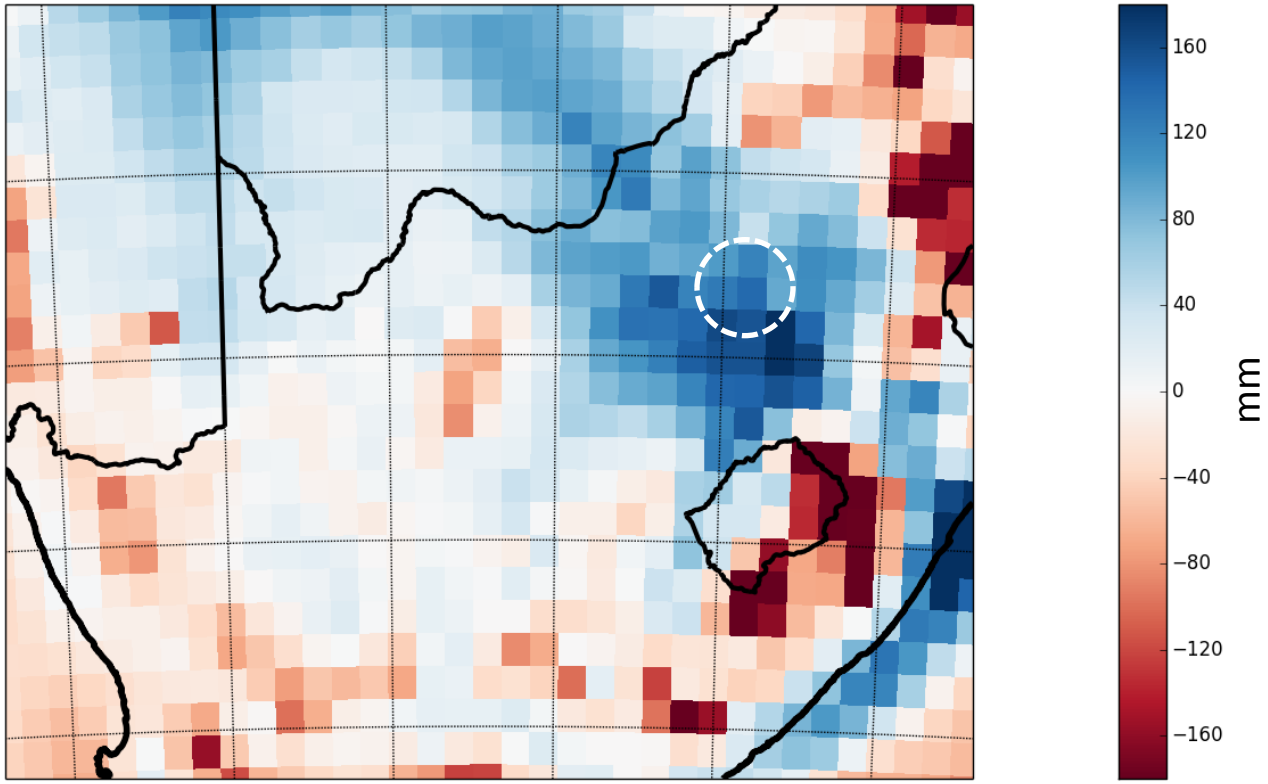
Maps of precipitation changes in 2046–2065 with respect to 1986 –2005 in the RCP4.5 scenario. The 25th, 50th and 75th percentiles of the distribution of the CMIP5 ensemble are shown; this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-year mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-year mean differences. Adapted from IPCC AR5 Synthesis Report 2014 (Figure AI.50)



Time series of relative change relative to 1986–2005 in precipitation averaged over land grid points in Southern Africa in October to March. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. Adapted from IPCC AR5 Synthesis Report 2014 (Figure AI.50)

Option A: Maintenance of cities current water infrastructure – especially storm water system.
Option B: Improve the supply of water to the city – support growth

CORDEX | High resolution projections for decision making



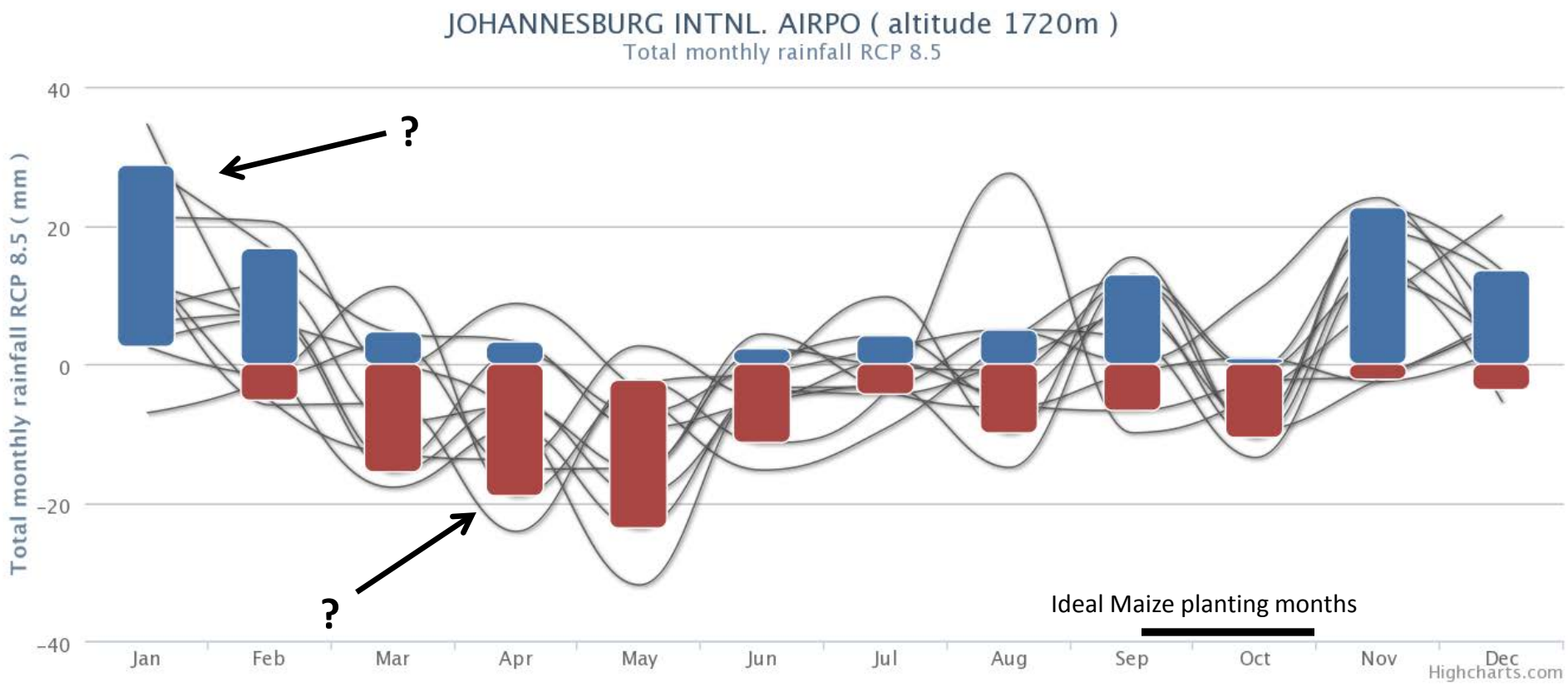
RCA4/MIROC5 50km projected changes in annual rainfall for 2031-2060

Option A: Maintenance of cities current water infrastructure – especially storm water system.
Option B: Improve the supply of water to the city – support growth

EXPERT | “Phone a friend” - Consult with an expert

Option A: Maintenance of cities current water infrastructure – especially storm water system.
Option B: Improve the supply of water to the city – support growth

DOWNSCALING | Multi-model statistical downscaling projections



CIP Climate Information Platform

www.cip.csag.uct.ac.za

Option A: Maintenance of cities current water infrastructure – especially storm water system.
Option B: Improve the supply of water to the city – support growth

Have you considered everything you need to be aware of?

Some headline messages from Ch 21:

A good understanding of decision-making contexts **is essential**

A **greater range of regional scale climate information is now available** which provides a more coherent picture of past and future regional changes with associated uncertainties

The **available information is limited** by the lack of comprehensive observations and analyses of regional climate

There is **substantial regional variation in observations and projections** of climate change impacts

There are **large variations in the study and implementation** of adaptation processes, practices and policy

Some headline messages from Ch 21:

Contested definitions and approaches to describing regional vulnerability pose problems

Cross-regional phenomena can be crucial for understanding the ramifications

Downscaling of global climate reconstructions and models **has advanced** … and the application has expanded

Characterization of uncertainty on regional scales has advanced to **incorporating uncertainties of future impacts societal vulnerability**

Studies of multiple stressors with multiple, non-climate elements are becoming increasingly common

Assessment of the many scales of activities already in place

Table 21-1: Dimensions of the institutions and actors involved in climate change decision-making … extended from Mickwitz (2009).

Coherent policies and decision-making

Multi-level organisation and governance

Level: \ Domain:	Economy	Energy	Food/fibre	Technology	Environment	…
Global	IMF/WB WTO MDGs NGOs	IEA NGOs	FAO WTO CLOS (fisheries) NGOs	WIPO NGOs	UNFCCC CBD Montreal Protocol NGOs	
Trans-national	MFIs/MDBs BFIs OECD/EU CLOS (transport)	OPEC Electric grid operators Oil/gas distributor	AFTA COMESA MERCOSUR EU CAP/CFP	Multi-nationals R&D EU Innovation Union	CLRTAP MRC LVBC EU Directives	
National	Ministry/Gov. Dept./Agency Banks Taxation	Ministry/Gov. Dept./Agency Energy provider Energy regulator	Ministry/Gov. Dept./Agency Tariffs, Quotas, Regulations	Ministry/Gov. Dept./Agency Education/R&D/ Innovation	Ministry/Gov. Dept./Agency Environmental law	
Sub-national	State/Province/ County/City Taxation	State/Province/ County/City Public/private energy provider	State/Province/ County/City Extension service Land use planning	State/Province/ County/City Incentives, Science parks	State/Province/ County/City Protected areas Regional offices	
Local	Micro-finance, Co-operative, Employer, Voter, Consumer	Renewables Producer, Voter, Consumer	Farmer, Forester, Fisher, Landowner, Voter, Consumer	Entrepreneur, Invester, Voter, Consumer	Environmentalist, Landowner, Voter, Consumer	

Learning from examples

Integrating messages from across reports

Table 21-4: Illustrative examples of adaptation experience, as well as approaches to reduce vulnerability and enhance resilience.

Early warning systems for heat
EXPOSURE AND VULNERABILITY: Factors affecting exposure and vulnerability include age, pre-existing health status, level of outdoor activity, socioeconomic factors including poverty and social isolation, access to and use of cooling, physiological and behavioral adaptation of the population, urban heat island effects, and urban infrastructure. [8.2.3-4, 11.3.3-4, 11.4.1, 11.7, 13.2.1, 19.3.2, 23.5.1, 25.3, 25.8.1, SREX Table SPM.1]
CLIMATE INFORMATION AT THE GLOBAL SCALE: **Observed:** *Very likely* decrease in the number of cold days and nights and increase in the number of warm days and nights, on the global scale between 1951 and 2010. [WGI AR5 2.6.1] *Medium confidence* that the length and frequency of warm spells, including heat waves, has increased globally since 1950. [WGI AR5 2.6.1] **Projected:** *Virtually certain* that, in most places, there will be more hot and fewer cold temperature extremes as global mean temperatures increase, for events defined as extremes on both daily and seasonal timescales. [WGI AR5 12.4.3]
CLIMATE INFORMATION AT THE REGIONAL SCALE: **Observed:** *Likely* that heat wave frequency has increased since 1950 in large parts of Europe, Asia, and Australia. [WGI AR5 2.6.1] *Medium confidence* in overall increase in heat waves and warm spells in North America since 1960. Insufficient evidence for assessment or spatially varying trends in heat waves or warm spells for South America and most of Africa. [SREX Table 3-2; WGI AR5 2.6.1] **Projected:** *Likely* that, by the end of the 21st century under RCP8.5 in most land regions, a current 20-year high temperature event will at least double its frequency and in many regions occur every two years or annually, while a current 20-year low temperature event will become exceedingly rare. [WGI AR5 12.4.3]

Learning from examples

Integrating messages from across reports

Table 21-4: Illustrative examples of adaptation experience, as well as approaches to reduce vulnerability and enhance resilience.

Index-based insurance for agriculture in Africa
EXPOSURE AND VULNERABILITY: Susceptibility to food insecurity and depletion of farmers' productive assets following crop failure. Low prevalence of insurance due to absent or poorly developed insurance markets or to amount of premium payments. The most marginalized and resource-poor especially may have limited ability to afford insurance premiums. [10.7.6, 13.3.2, Box 22-1]
CLIMATE INFORMATION AT THE GLOBAL SCALE: **Observed:** *Very likely* decrease in the number of cold days and nights and increase in the number of warm days and nights, on the global scale between 1951 and 2010. [WGI AR5 2.6.1] *Medium confidence* that the length and frequency of warm spells, including heat waves, has increased globally since 1950. [WGI AR5 2.6.1] Since 1950 the number of heavy precipitation events over land has *likely* increased in more regions than it has decreased. [WGI AR5 2.6.2] *Low confidence* in a global-scale observed trend in drought or dryness (lack of rainfall). [WGI AR5 2.6.2] **Projected:** *Virtually certain* that, in most places, there will be more hot and fewer cold temperature extremes as global mean temperatures increase, for events defined as extremes on both daily and seasonal timescales. [WGI AR5 12.4.3] Regional to global-scale projected decreases in soil moisture and increased risk of agricultural drought are *likely* in presently dry regions, and are projected with *medium confidence* by the end of this century under the RCP8.5 scenario. [WGI AR5 12.4.5] Globally, for short-duration precipitation events, *likely* shift to more intense individual storms and fewer weak storms. [WGI AR5 12.4.5]

Scale Dependencies and Reliability of information

Table 21-6: Reliability of climate information on temperature and precipitation over a range of spatial and temporal scales. Reliability is assigned to one of seven broad categories from Very High (VH) to Medium (M) through to Very Low (VL).

DATA IS NOT EQUAL TO INFORMATION

Scale	Temporal	Annual		Seasonal-Monthly		Daily	
Spatial	Era / Variable	Temp	Precip	Temp	Precip	Temp	Precip
Global	Past	VH	H	VH	H	N/A	N/A
	Future change	VH – direction H – amount	H – direction MH – amount	VH – direction H – amount	H – direction MH – amount	N/A	N/A
Regional, Large river basin	Past	VH-H depends on observation availability	H-L depends on observation availability	VH-H depends on observation availability	H-L depends on observation availability	VH-H depends on observation availability	H-L depends on observation availability
	Future change	VH – direction H – amount	H-L depends on capture of processes	VH – direction MH – amount	H-L depends on capture of processes	VH – direction MH – amount	H-L depends on capture of processes
National, State	Past	VH-H depends on observation availability	H-L depends on observation availability	VH-H depends on observation availability	H-L depends on observation availability	VH-H depends on observation availability	H-VL depends on observation availability
	Future change	VH – direction MH – amount	H-L depends on capture of processes	VH – direction MH – amount	H-L depends on capture of processes	H – direction MH – amount	H-VL depends on capture of processes

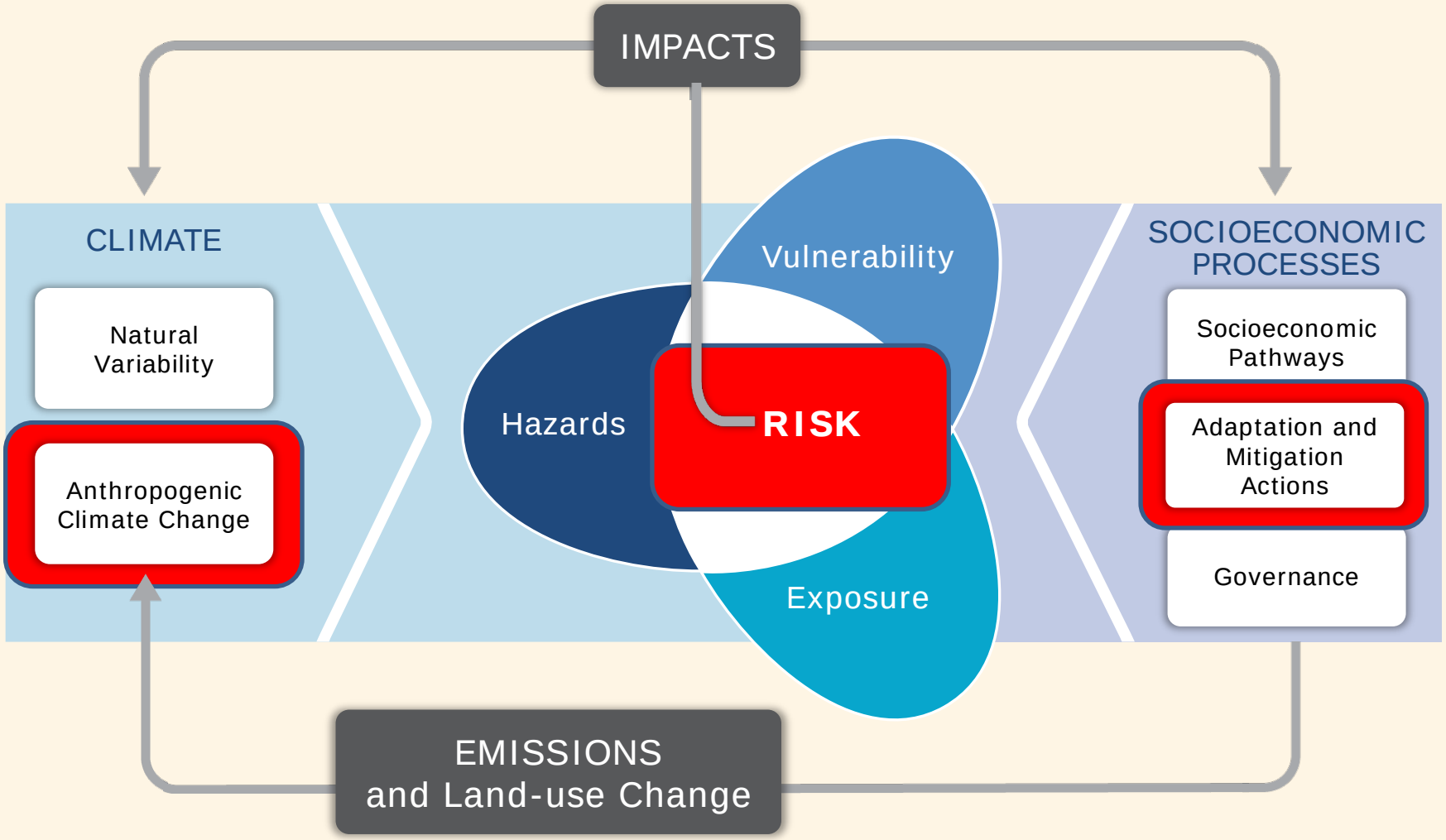
New information on regional extremes

Table 21-7: An assessment of observed and projected future changes in temperature and precipitation extremes over 26 sub-continental regions as defined in the SREX report

An update to SREX

Region/ region code	Trends in daytime temperature extremes (frequency of hot and cool days)		Trends in nighttime temperature extremes (frequency of warm and cold nights)	
	Observed	Projected	Observed	Projected
West Africa WAF, 15	Significant increase in temperature of hottest day and coolest day in some parts[a] Insufficient evidence in other parts[a]	*Likely* increase in hot days (decrease in cool days)[b]	Increasing frequency of warm nights. Decrease in cold nights in western central Africa, Nigeria, and Gambia[a] Insufficient evidence on trends in cold nights in other parts[a]	*Likely* increase in warm nights (decrease in cold nights)[b]
East Africa EAF, 16	Lack of evidence due to lack of literature and spatially non-uniform trends[a] Increases in hot days in Southern tip (decrease in cool days)[a]	*Likely* increase in hot days (decrease in cool days)[b]	Spatially varying trends in most areas[a] Increases in warm nights in Southern tip (decrease in cold nights)[a]	*Likely* increase in warm nights (decrease in cold nights)[b]
Southern Africa SAF, 17	*Likely* increase in hot days (decrease in cool days)[a, c]	*Likely* increase in hot days (decrease in cool days)[b]	*Likely* increase in warm nights (decrease in cold nights)[a, c]	*Likely* increase in warm nights (decrease in cold nights)[b]

Added stress from Climate change – additional needs for adaptation and mitigation



Risk, Impacts and responses are PLACE and SECTOR specific = CONTEXT